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APPENDIX 32
IFMR - PE INTERFACE
FINAL SOFTWARE REPORT
DATA ITEM NO. A005

INTEGRATED ELECTRONIC WARFARE SYSTEM ADVANCED DEVELOPMENT MODEL (ADM)

7800987-32
PREPARED FOR
NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA

CONTRACT N62269-75-C-0070

RAYTHEON

ELECTROMAGNETIC
SYSTEMS DIVISION

1 OCTOBER 1977

UNCLASSIFIED

APPENDIX 32

IFM RECEIVER/PARAMETER ENCODER INTERFACE

FINAL SOFTWARE REPORT

DATA ITEM A005

INTEGRATED ELECTRONIC WARFARE SYSTEM (IEWS)
ADVANCED DEVELOPMENT MODEL (ADM)

Contract No. N62269-75-C-0070

Prepared for:

Naval Air Development Center
Warminster, Pennsylvania

Prepared by:

RAYTHEON COMPANY
Electromagnetic Systems Division
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1 OCTOBER 1977

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1.0 SCOPE

This document shall describe the interface between the Instantaneous Frequency Measurement Receiver (IFMR) and the Parameter Encoder. The functional as well as the detailed physical requirements shall be included in this document.

2.0 APPLICABLE DOCUMENTS

IEWS ICD 53959-NK-1400

3.0 REQUIREMENTS

3.1 INTERFACE DEFINITIONS

An interface shall be established between the IFMR and the Parameter Encoder for the purpose of transferring emitter detection and frequency information. The interface shall be organized as shown in Figure 1. Data transfer control shall reside in the IFMR.

3.2 PERFORMANCE REQUIREMENTS

3.2.1 Data Rates

The maximum data rate is 476K frequency words per second. This data rate is based upon the minimum pulse width, 100 ns, and the minimum interpulse spacing, 2.1 μ sec allowed by the IFMR.

3.2.2 Timing

The timing associated with the IFMR/PE interface shall be as shown in Figure 2.

3.3 DATA STRUCTURE

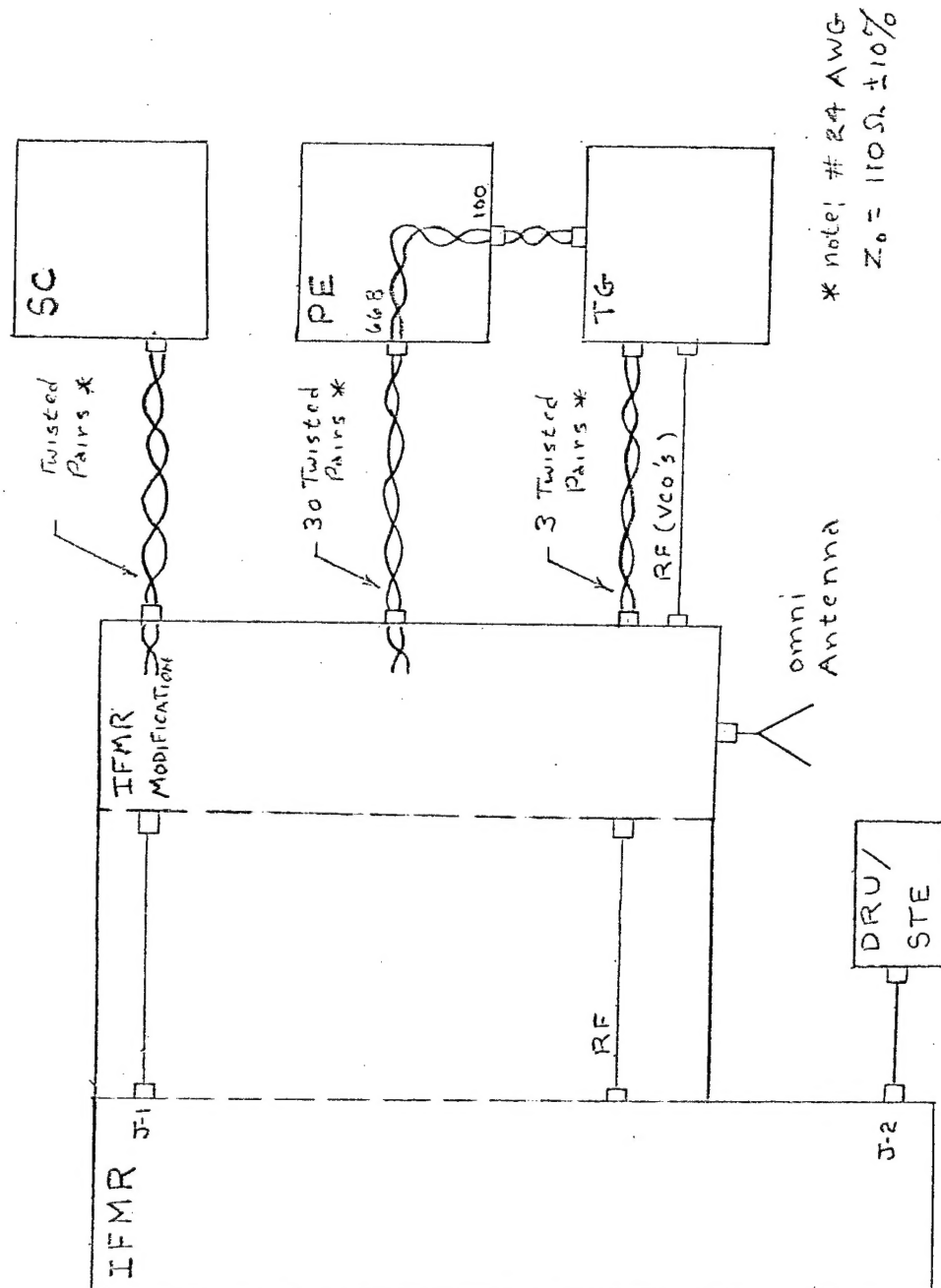


FIGURE 1 . . . TFMR / PE INTERFACE

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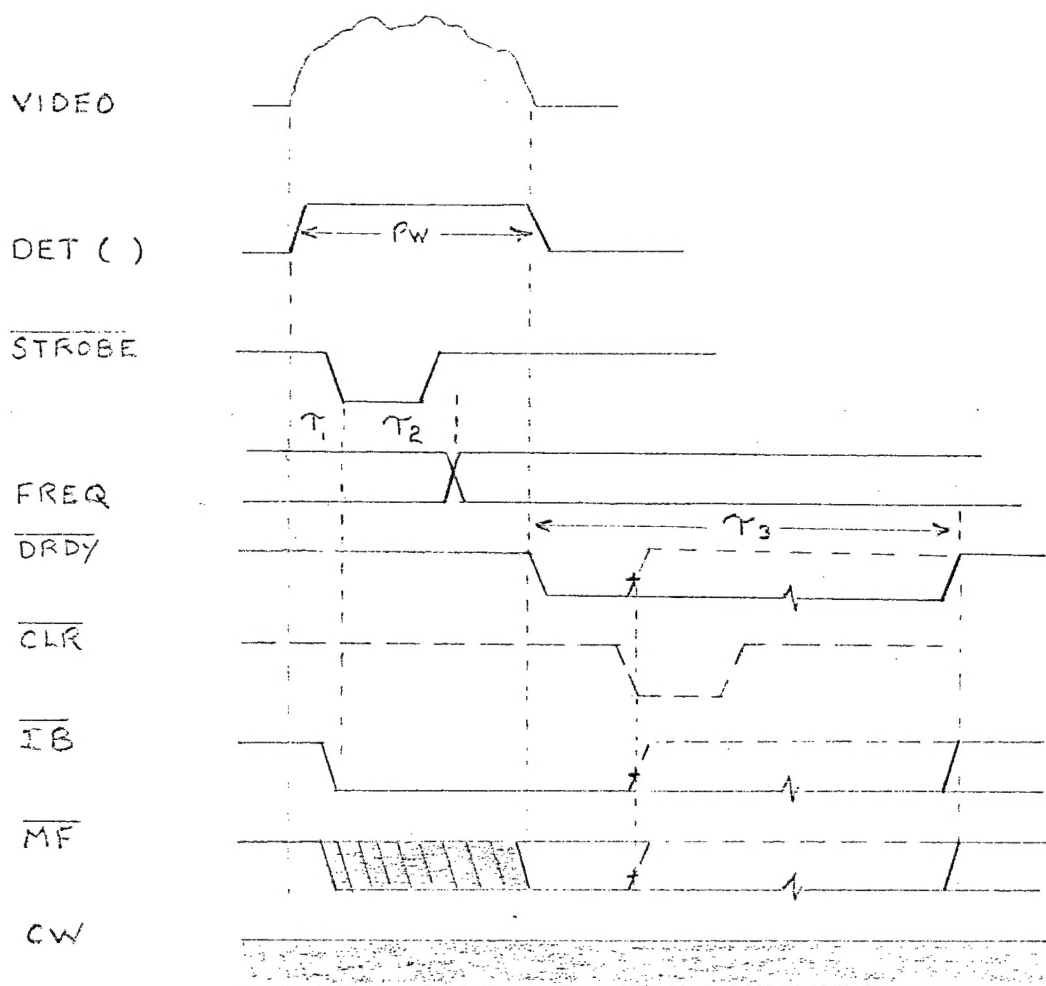
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$$\tau_1 = 100 \text{ ns}$$

$$\tau_2 = 250 \text{ ns}$$

$$\tau_3 = 2 \mu\text{s (unless CLEARED)}$$

Figure 2 INTERFACE TIMING

3.3.1 IFMR/IFMR Modification

The IFMR/IFMR Modification interface as shown in Figure 3 shall consist of:

Lines	Signal
14	Frequency Word (FREQ 00-13)
1	Intraband Detection (IB)
1	Multiple Frequency (MF)
1	Detection Channel A (DETA)
1	Detection Channel B (DETB)
1	Detection Channel C (DETC)
1	Detection Channel D (DETD)
1	Detection Strobe (STROBE)
1	CW Flag (CW)
2	CW Band (CW 00-01)
1	Data Ready (DRDY)
1	Clear (CLR)
1	Interpulse Activity (IACT)
1	+5v
1	-5v
3	GND
1	+12v

32 Total

3.3.2 IFMR/PE

The IFMR/PE interface as shown in Figure 4 shall consist of:

Lines	Signal
14	Frequency Word (FREQ 0-13)
1	Intraband Detection (IB)
1	Multiple Frequency (MF)
1	Detection Channel A (DETA)
1	Detection Channel B (DETB)
1	Detection Channel C (DETC)

- 1 Detection Channel D (DETD)
- 1 Detection Strobe (STROBE)
- 1 CW Flag (CW)
- 1 Data Ready (DRDY)
- 1 Clear (CLR)

24 Total

3.4 DESIGN REQUIREMENTS

3.4.1 Line Drivers/Line Receivers

All line drivers and line receivers shall incorporate SN75110 and SN75107A type devices respectively. The IFMR output shall be terminated on both ends with the termination network specified in Figure 5.

3.4.2 Interconnecting Transmission Lines

All interconnection cables used for this interface shall utilize twisted pair. The characteristic impedance shall be $110\Omega \pm 5\%$. A termination plug shall be provided which is a matched pair ($\pm 1\%$) of 56 ohm resistors for each signal and its return as shown in Figure 5.

3.4.3 Interface Signal Definition

Figure 4 provides the interface signals between the IFM and the Parameter Encoder. Signals FREQ 00+ and FREQ 00- are the signal and the return respectively for the least significant frequency data bit.

CLR - Clear is a logic signal generated externally which resets the DATA READY and allows a new measurement to be made. An internal clear is generated by the IFM 2 μ sec after receipt of DRDY.

CW - CW Flag is a logic signal generated upon receipt of a signal longer than 100 μ sec and CW remains until the signal is terminated.

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IFMR/IIU INTERFACE

IFMR
J-1
OUTPUT
CONNECTOR

A	FREQ 00
B	FREQ 01
C	FREQ 02
D	FREQ 03
E	FREQ 04
F	FREQ 05
G	FREQ 06
H	FREQ 07
J	FREQ 08
K	* +5
L	* DETA
M	* DETB
N	* DETC
P	* DETD
R	* -5
S	* STROBE
T	** GND
U	CLEAR
V	FREQ 09
W	FREQ 10
X	FREQ 11
Y	FREQ 12
Z	FREQ 13
a	MF
b	IN ACT
c	CW 01
d	CW 00
e	CW FLAG

IFM
INTERFACE
UNIT

FIGURE 3

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IFMR/IU INTERFACE

IFMR
J-1
OUTPUT
CONNECTOR

f GND

g GND

h DRDY

i ** \overline{IB}

* +12V

IFM
INTERFACE
UNIT

* New Signals Added

** Require Verification

FIGURE 3 (Continued)

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IU/PE INTERFACE

IFM
INTERFACE
UNIT

1	FREQ 00 +	PE
2	FREQ 00 -	
3	FREQ 01 +	
4	FREQ 01 -	
5	FREQ 02 +	
6	FREQ 02 -	
7	FREQ 03 +	
8	FREQ 03 -	
9	FREQ 04 +	
10	FREQ 04 -	
11	FREQ 05 +	
12	FREQ 05 -	
13	FREQ 06 +	
14	FREQ 06 -	
15	FREQ 07 +	
16	FREQ 07 -	
17	FREQ 08 +	
18	FREQ 08 -	
19	FREQ 09 +	
20	FREQ 09 -	
21	FREQ 10 +	
22	FREQ 10 -	
23	FREQ 11 +	
24	FREQ 11 -	
25	FREQ 12 +	
26	FREQ 12 -	
27	FREQ 13 +	
28	FREQ 13 -	
29	MF +	
30	MF -	

FIGURE 4

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IIU/PE INTERFACE

IFM
INTERFACE
UNIT

PE

31	$\overline{\text{CW}} +$
32	$\overline{\text{CW}} -$
33	$\overline{\text{DRDY}} +$
34	$\overline{\text{DRDY}} -$
35	$\overline{\text{STROBE}} +$
36	$\overline{\text{STROBE}} -$
37	$\overline{\text{IB}} +$
38	$\overline{\text{IB}} -$
39	DETA +
40	DETA -
41	DETB +
42	DETB -
43	DETC +
44	DETC -
45	DETD +
46	DETD -
47	$\overline{\text{CLR}} +$
48	$\overline{\text{CLR}} -$
49	
50	
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57	
58	
59	
60	

FIGURE 4 (Continued)

DETA - DETECTION STROBE A is a normalized video pulse generated when a video pulse is detected in Channel A. Receipt of a DETECTION STROBE does not guarantee that a frequency measurement will be produced. If a frequency measurement is produced the data will be ready 350 ns after receipt of the detection strobe leading edge.

DET B - DETECTION STROBE B is the same as DETECTION STROBE A for Channel B.

DET C - DETECTION STROBE C is the same as DETECTION STROBE A for Channel C.

DET D - DETECTION STROBE D is the same as DETECTION STROBE A for Channel D.

DRDY - DATA READY is a logic signal that indicates the IFMR information is stable and available. It is generated after the trailing edge of the measured pulse and remains for 2 μ sec, unless cleared.

FREQ 00-13 - FREQUENCY is a 14 bit word (LSB 1.25 MHz) which indicates the frequency of the initial pulse during a measurement process. It is available 250 ns after the DETECTION STROBE and remains until a new measurement is made.

IB - SIMULTANEOUS SIGNAL INTRABAND is a logic signal generated when a second signal is detected in the measured channel during the initial 100 ns. This second signal must be ± 6 dB of the first and within ± 150 to 500 MHz or ± 4 , 150 to 4,500 MHz. It is reset at this end of DATA READY.

MF - SIMULTANEOUS SIGNAL is a logic signal generated if a threshold crossing occurs during a measurement process or if an INTRABAND SIGNAL is detected. It is latched into SIMULTANEOUS SIGNAL prior to DATA READY and reset at the end of DATA READY.

STROBE - MEASUREMENT STROBE is a logic signal which occurs 100 ns after a pulse leading edge and indicates that a frequency measurement is being made and that frequency information will be available in 250 ns.

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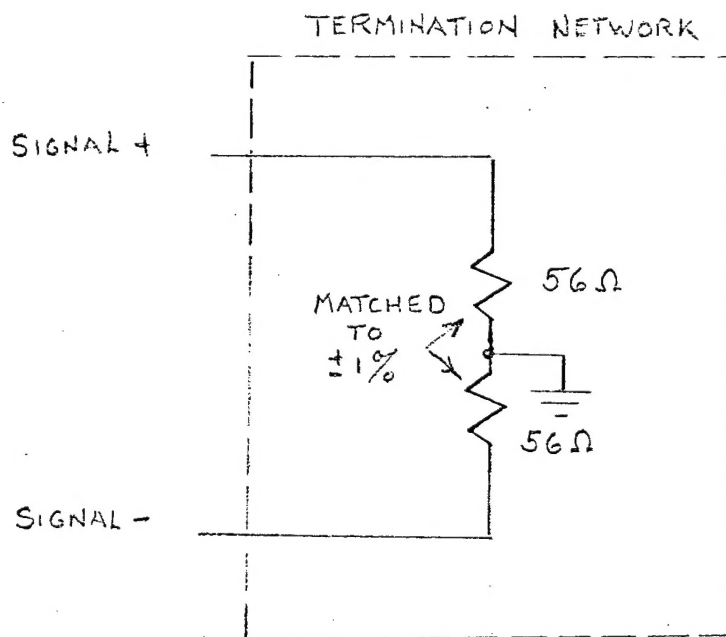


Figure 5 IFMR TERMINATION